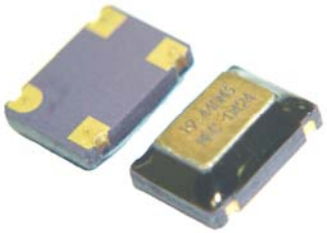
Voltage Controlled Temperature Compensated Crystal Oscillators VCTCXO, VM57T Series, CMOS Output

MERCURY
Since 1973

Features:
- ♦ 5x7x2.5 mm ceramic SMD VCTCXOs with CMOS square wave output
- ♦ 0.01 uF decoupling capacitor built-in
- ♦ Wide frequency range: 1.0 MHz to 156.0 MHz
- ♦ Frequency stability as tight as ±0.5 ppmover 0°C to +50°C or ±1 ppm over -40 to +85°C



RoHS Compliant Product by Mercury

General Specifications (at+25°C and specified input voltage)

Product Series		**VM57T**					
Frequency Range		1.0 MHz ~ 156.0 MHz NOTE: 32.768 KHz is also available					
Output Wave From		**Square** wave. Wave form code is "**T**"					
Initial Calibration Tolerance (1)		±2 ppm at +25°C±2°C and Vcon = +1.5 V D.C.					
Standard Frequencies (partial list)		10.0, 12.8, 13.0, 14.4, 16.0, 16.384, 19.2, 19.440, 19.680, 20.0, 38.880 , 77.760 , 155.520 MHz					
Frequency Stability (ppm)		±0.5 pppm	± 1 ppm	±1.5 ppm	±2.0 ppm	±2.5 ppm	√: Available □: Call us ✕: N/A (Not available)
Temperature Range	**0 to +50°C**	√	√	√	√	√	
	-10 to +60°C	□	√	√	√	√	
	-20 to +70°C	✕	√	√	√	√	
Standard ➔	**-30 to +75°C**	✕	√	√	√	√	
	-40 to +85°C	✕	√	√	√	√	
Frequency Stability							
vs Aging		±1.0 ppm max. first year at +25°C					
vs Voltage Change		±0.3 ppm max. for a ±5% input voltage change					
vs Load Change		±0.3 ppm max. for a ±10% loading condition change					
vs Reflow		±1 ppm max. 1 reflow and measured 24 hours afterwards					
Supply Voltage (V_{DD})		**+2.8 V** (voltage code is "**28**")	**+3.0 V** (voltage code is "**3**")	**+3.3 V** (voltage code is "**33**")	**+5.0 V** (voltage code is "**5**")		
Current Consumption (typical)		2 mA @ 8.192MHz 3 mA @ 10 MHz 14 mA @77.760 MHz 26 mA @ 155.520 MHz	2 mA @ 8.192MHz 4 mA @ 10 MHz 17 mA @77.760 MHz 35 mA @ 155.520 MHz		5 mA @ 8.192MHz 7 mA @ 10 MHz 32 mA @77.760 MHz 50 mA @ 155.520 MHz		
Output Voltage Level	**Logic "1"**	**90% V_{DD}** min.					
	Logic "0"	**10% V_{DD}** max.					
Rise Time and Fall Time		10 nano. sec. max. 20% ↔ 80% of waveform					
Duty Cycle (Symmetry)		50%±10% measured at 50% waveform					
Start-up Time		10 m. sec. max.					
Electronic Frequency Tuning on pad 1. (VCTCXO only)	**Frequency Deviation Range**	±10 ppm typical with Vcontrol centered at = +1.5 V and Vcontrol range of ±1.0 V					
	Slope Polarity	Positive: **Positive voltage for positive frequency shift**					
	Linearity	±10 % max.					
Output Load		15 pF					
SSB Phase Noise	**Offset**	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	5 MHz

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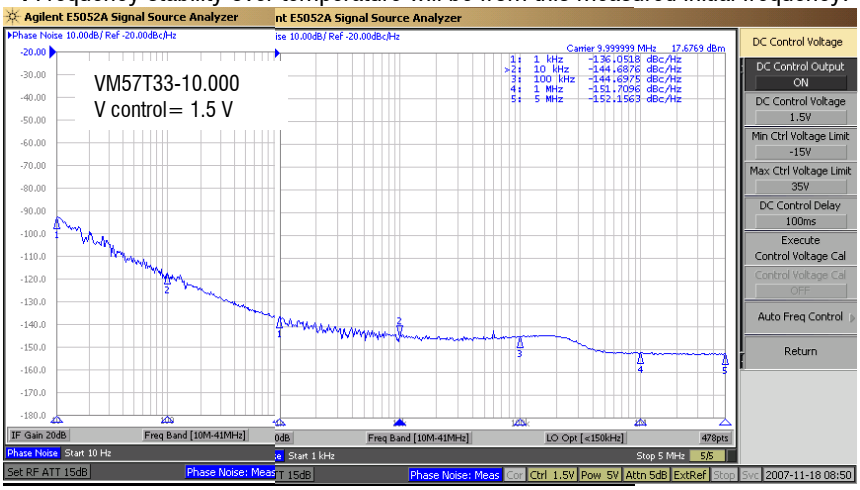
at +25°C (dBc/Hz)	**VM57T33-10.000 (see plot below)**	-93	-117	-137	-144	-144	-151	-152
	VM57T33-155.520	-62	-88	-111	-121	-116	-107	-122

(1): Frequency stability over temperature will be from this measured initial frequency.

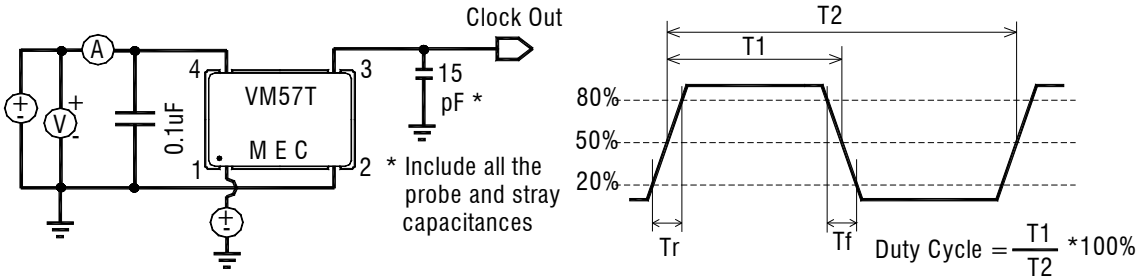


Part Number Format and Example:

Part number example:	VM57T3-20.000-2.5/-30+75						✍= Please specify	
	✍		✍		✍		✍	
VM57T	3	—	**20.000**	—	**2.5**	/	**-30+75**	
❶	❷		❸		❹		❺	

❶: Product Series ❷: Voltage code; Use"**28**" for +2.8 V; use "**3**" for +3.0 V; use "**33**" for +3.3 V; use "**5**" for +5.0 V ❸: Frequency in MHz ❹: Frequency stability ❺: Operating Temperature range in °C

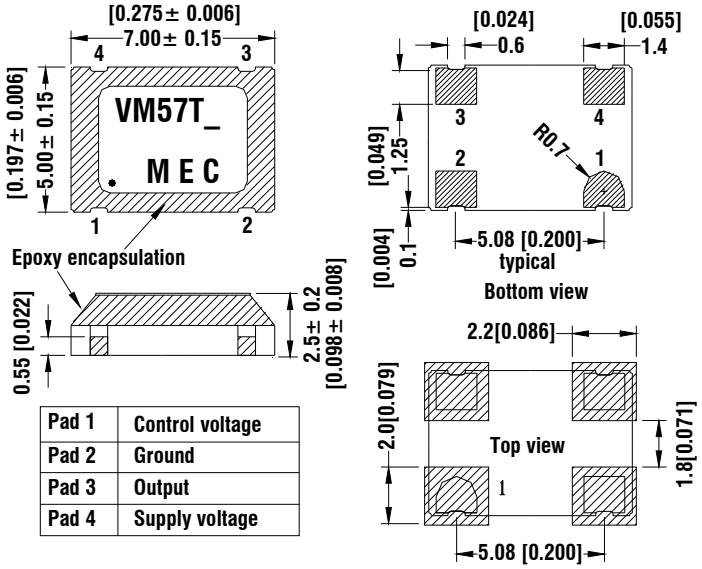
CMOS Square Wave VCTCXO Test Circuit:



Environment Performance Specifications

Green Requirement	RoHS compliant, Pb (lead) free
MSL Level	MSL 1 per IPC/JEDEC-STD-020C
Humidity	85% RH, 85°C, 48 hours
Hermeticity	Leak rate $2x10^{-8}$ ATM-cm^3/sec max. Crystal part only.
Solderability	MIL-STD-202F method 208E
Vibration	MIL-STD-202F method 204, 35G, 50 to 2000 Hz
Shock	MIL-STD-202F method 213B, test condi. E, 1000GG ½ sine wave
Storage temp. range	-55 to +125°C

Package Dimensions and Suggested Land Pattern: Unit: mm



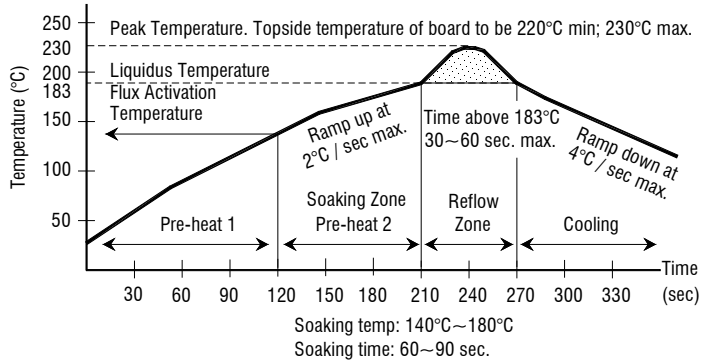
Pad 1	Control voltage
Pad 2	Ground
Pad 3	Output
Pad 4	Supply voltage

Rounded pad is pad No. 1. Count counter-clockwise when looking at top view.
Count clockwise when looking at bottom view. 0.01 uF decoupling capacitor is built-in.

Recommended Reflow Soldering Profile

245°C liquidus 221°C solidus solder alloy is used in the assembly of VM57T products.
Do not exceed the reflow conditions given below

Profile A (low temperature solder reflow): For Sn62 Pb36 Ag2 and Sn63 Pb37 alloy.



Profile B (high temperature solder reflow): For Sn96.5% Ag 3.5% Cu 0.5% alloy.